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UNDESCRIBED HORSE FLIES FROM THE SOUTHWESTERN
UNITED STATES AND NORTHERN MEXICO
(DIPTERA: TABANIDAE)

JOHN F. BURGER

12116 Gaynor Road, Rockville, Maryland 20853

ABSTRACT—From a study of the biology and taxonomy of Arizona Tabanidae, 2 new species in the *Tabanus gilanus* group and the male of *Tabanus boharti* Philip are here described and illustrated for the first time, notes on larval habitats are presented, and a key is given to differentiate the adults of most species in the *Tabanus gilanus* group occurring in Arizona.

While studying the biology and taxonomy of immature Tabanidae in Arizona during 1968–1970, I collected and reared 2 previously undescribed species of *Tabanus* and the undescribed male of *Tabanus boharti* Philip. These species are allied with the *Tabanus gilanus* group of horse flies.

Tabanus boharti Philip

fig. 1

Neallotype ♂, 15.0 mm. Eyes sparsely pilose, hairs short; eye pattern in life 2 very narrow light green bands on brownish-purple ground; areas of large and small facets sharply differentiated, upper $\frac{2}{3}$ of eye with large facets. Frontal triangle grayish pollinose, with yellowish tinge along margin of eye and irregular black spot at apex above. Face and genae whitish pollinose, except yellowish tinge along margin of eye. Antennae dark brown basally, black beyond dorsal angle of plate; first segment robust but not extended above second segment dorsally; plate of third segment about 1.2 times longer than broad, dorsal angle prominent, excision shallow; annulae about as long as plate. Palpi yellowish, covered with grayish pollen and white hair; second segment stout, with small, downward-pointing nipple; length of second segment about twice width.

Thorax with gray and black lines distinct; dorsal surface densely covered with erect white and black hair, white hair predominant, and clothed with mixture of black and cupreous appressed hair; scutellum concolorous with thorax. Pleura and coxae whitish pruinose, densely clothed with white hair. Legs dark, covered with gray pollen; basal $\frac{1}{2}$ of fore-tibiae and basal $\frac{2}{3}$ of mid- and hind-tibiae yellowish orange, remainder black; tarsi black. Wings hyaline, veins dark brown.

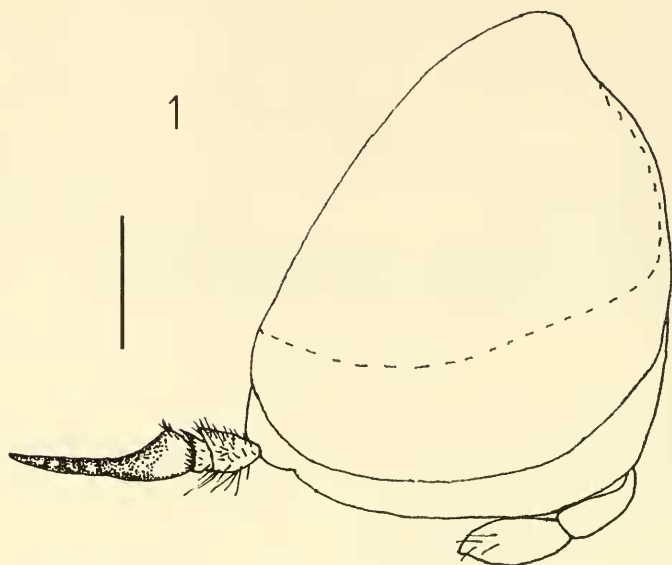


Fig. 1. *Tabanus boharti*, ♂. Profile of head of neallotype. Scale 1.0 mm.

Abdomen dark grayish black; first tergum pale, except for two submedian dark spots; pale median triangles large on terga II-IV, about $\frac{1}{3}$ taller than broad and covering about $\frac{2}{3}$ height of terga, becoming progressively smaller on posterior segments; sublateral pale dashes large, oblique, extending length of all segments except I and broadly expanded along posterior margin of each segment; terga I and II with yellowish spot laterally. Venter grayish pollinose, with some brownish tinges; broad, longitudinal, median black band of erect, black hair extending length of venter; first sternum with 2 conspicuous, yellowish-brown spots laterally.

Green Spring, Santa Catalina Mts., Pima Co., Arizona, 21-VII-1969, 7600 ft., J. Burger, reared. Neallotype deposited in the United States National Museum (USNM).

Other males were reared from Madera Canyon, Santa Rita Mts., Santa Cruz Co., Arizona, 22-IV-1969, 6250 ft., J. Burger, 1♂, and Sierra Manzanal, nr. Cananea, Sonora, Mexico, 27-XII-1969, 5725 ft., J. Burger, 2♂♂. These specimens are similar to the neallotype, except the Sierra Manzanal specimens have more yellowish suffusion laterally on the second abdominal tergum.

The male of *T. boharti* differs from the female primarily in having much denser, white, erect hair dorsally on the thorax and more extensive pale markings on the abdomen, particularly the larger sublateral dashes. Rubbed specimens tend to be more grayish than fresh ones.

Philip (1950) described *T. boharti* from White House Canyon, Santa Rita Mountains, Arizona. This locality is now called Madera Canyon. Based on immature stages as well as adults, *T. boharti* appears to be in the *Tabanus gilanus* group of horseflies.

Philip (1950) stated that *T. boharti* probably has been mistaken for *Tabanus pruinosus* Bigot, and accounted for earlier Nearctic records of *T. pruinosus*, but since *T. boharti* has not been collected north of the Santa Catalina Mountains near Tucson, probably another species in the *gilanus* group was mistaken for *T. pruinosus*. A related species described below sometimes has a strongly reddish-pruinose thorax which is characteristic of *T. pruinosus*. I have reared *T. pruinosus* from 3 localities in Santa Cruz County, Arizona, and this is apparently its present northern limit of distribution in the United States. Philip (1950) also considered Townsend's record of "*T. vivax*" (Townsend, 1892) to be *T. boharti*, but this is highly unlikely, based on present knowledge of *T. boharti* distribution. Probably it is another species of the *gilanus* group, but its identity cannot be definitely determined from Townsend's brief description.

Larvae of *T. boharti* were collected from the Sierra Manzanal in northern Sonora, Mexico northward to the northern side of the Santa Catalina Mountains north of Tucson, Arizona in Pima Co. The larvae live in moss mats that grow on rocks in mountain streams or springs, from 5000 to 7600 ft. Occasionally I found larvae in soil or rotting logs along stream margins. The larvae are submerged when the streams are running during the spring season. Before pupation, the larvae move to drier moss above the water line. Although apparently favorable habitats for this species exist in the Chiricahua and Huachuca Mountains of southeastern Arizona, I failed to find this species in either range. The streams there may be too intermittent to support *T. boharti* larvae, which are intolerant of desiccation.

Tabanus caenosus Burger, new species

fig. 2, 3

A medium-sized dark grayish species with hyaline wings, denuded subcallus, 3 rows of pale markings on abdomen, sublateral ones isolated from tergal margins. General appearance similar to *Tabanus pruinosus* but usually lacking the reddish-pruinose color and subcallus always denuded.

Holotype ♀, 15.5 mm. Eyes essentially bare, although microscopic scattered hairs visible in certain lights; eye color in life dark brown with purplish reflections and 2 light green stripes. Front narrowed below, gradually widening above, grayish pollinose, brownish spots present on either side of median callosity and around vertex, 1:3.5; basal callosity round, black, narrowly joined with narrow, black median callosity, not quite touching eyes below. Subcallus mostly bare, shining black, bare area crescent-shaped, pollinose only above antennae and along outer edges. Genae tinged light brown adjacent to subcallus and clothed with black hair; remainder of genae and face grayish, clothed with

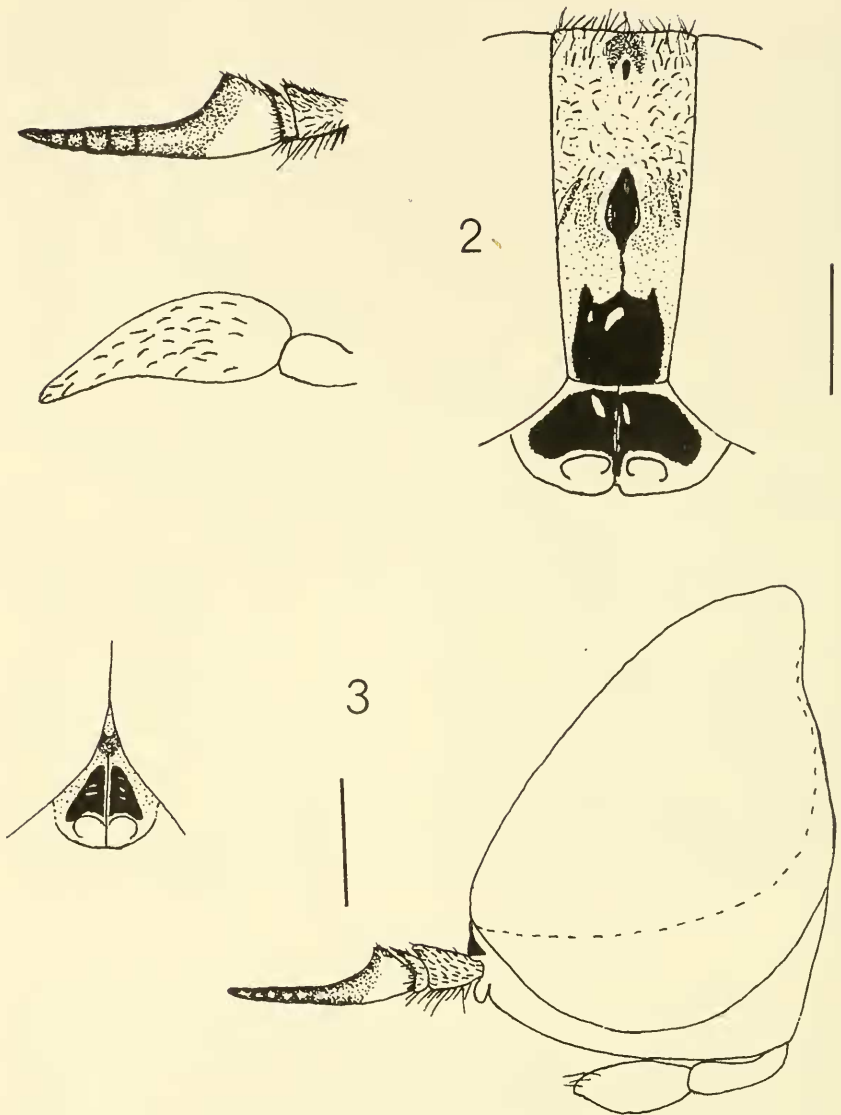


Fig. 2-3. *Tabanus caenosus*. 2, ♀. Frons, antenna and palpus of holotype. 3, ♂. Profile of head; frontal triangle of allotype. Scale 1.0 mm.

white hair. First and second antennal segments yellowish orange, clothed with black hair; first segment but slightly enlarged; third segment yellowish orange to dorsal angle, remainder black; dorsal angle of third segment acute, plate moderately excised dorsally, about 1.15 times longer than broad; annulate por-

tion slightly shorter than basal portion. Second segment of palpus stout basally, rather evenly tapered apically, creamy white and clothed with mixture of white and black hairs dorsally and anteriorly and dense, long white hair ventrally along basal half.

Thorax blackish, with grayish lines, clothed with short, erect, black hair and mixture of black and cupreous appressed hairs; pre-alar lobes orange; thoracic area above wing base and hind margin of scutellum densely clothed with white hair. Pleura grayish, clothed with dense, white hair. Coxae and femora blackish, gray pollinose and clothed with white hair, except fore-femora blackish on upper surface; fore-tibiae reddish orange on basal $\frac{1}{2}$, black apically; mid-tibiae reddish orange on basal $\frac{4}{5}$, black on apical $\frac{1}{5}$; hind-tibiae reddish orange on basal $\frac{2}{3}$, remainder black; tarsi black; hind tibial fringe with mixed white and black hair, white predominating on basal half, black on apical half. Wings hyaline, veins dark brown, venation normal. Halteres with knobs brown, stalks pale.

Abdomen blackish above, grayish below; abdominal pattern consisting of pale, median irregular triangles which are progressively smaller from terga II-V and isolated pale, sublateral spots well separated from hind margin of each tergum; median triangle on segment II tall, about 3 times as long as broad, almost reaching anterior edge of tergum; no trace of triangle on segment VI; second tergum with patch of pale hair along anterolateral margins. Venter grayish, with broad, median black line of black hair; pale hair present laterally on the anterior 4 sterna, posterior 2 sterna clothed with black hair.

Southwestern Research Station, Chiricahua Mountains, Cochise Co., Arizona, 12-VII-1969, 5520 ft., J. Burger, reared. Holotype deposited in USNM.

Allotype ♂, 15.0 mm. Head broad; eye distinctly pilose; upper facets distinctly larger than lower ones and sharply differentiated from them, large facets occupying upper $\frac{2}{3}$ of eye. Vertical tubercle grayish pollinose, raised above level of eyes at vertex. Frontal triangle denuded mesally, bare area irregularly crescentic and shiny black. Antennae similar to holotype except plate of third segment shorter and narrower, about 1.3 times longer than wide; annulae slightly longer than plate. Palpi pale creamy white with faint yellowish tinge, clothed with pale hair and 2 or 3 black ones apically.

Dorsal surface of thorax covered with long, dense, white hair. Mid-tibiae orange, mid-tarsi orange on basal $\frac{1}{4}$, remainder black, otherwise legs as in holotype. Wings and halteres similar to holotype.

Pale median triangles and sublateral spots of abdomen much broader and more extensive than in holotype; median triangles approximately equilateral, extending about $\frac{2}{3}$ length of terga and expanded along posterior margins to lateral margins of terga. Otherwise, abdomen similar to holotype.

Rose Creek, Sierra Ancha Mountains, Gila Co., Arizona, 4-VII-1969, 5400 ft., J. Burger, reared. Allotype deposited in USNM.

Paratypes listed below, unless otherwise stated, are in the collection of the author. Paratypes borrowed from and returned to various individual collections and institutions are designated as follows: California Academy of Sciences and Dr. C. B. Philip (CAS); Cornell

University and Dr. L. L. Pechuman (CU); Dr. G. B. Fairchild collection (GBF); University of Arizona, Tucson (UA); University of California, Berkeley (UCB); University of California, Davis (UCD); and USNM.

ARIZONA. *Cochise Co.*—Herb Martyr Lake, Cave Cr. Cn., Chiricahua Mts., 10-20-VIII-1966, 6000 ft., F. G. Werner, 2♂♂, 1♀ (UA); 24-III-1970, 5860 ft., J. Burger, 2♂♂, reared. Rucker Cn., Chiricahua Mts., 25-IX-1961, ca. 6000 ft., J. Bequaert, 1♀ (UA). Southwestern Res. Sta., Chiricahua Mts., 3-VI/12-VII-1969, 5420 ft., J. Burger, 4♂♂, 7♀♀, reared; 22-III/4-VII-1970, J. Burger, 11♂♂, 5♀♀, reared; 1965, Sabrosky, 1♀ (USNM); 3-VIII-1967, Robert G. Beard, 3♂♂ (CU); 10-VIII/9-IX-1959, H. E. & M. A. Evans, 2♀♀ (CU); 1-VIII-1955, P. D. Hurd, 1♀ (CU); 7-VIII-1966, J. G. Franclemont, 1♀ (CU); 20-VII-1969, L. L. Pechuman, 1♀ (CU); C. & M. Cazier, 1♀ (CAS); 7-VIII-1958, D. D. Linsdale, 1♀ (CAS); 7-VIII-1958, P. M. Marsh, 1♂ (CAS); 1-VIII-1957, M. Statham, 1♂ (CAS); 14-VIII-1959, 1♀ (UCB); 10-VIII-1961, W. J. Hanson, 1♂ (GBF). John Hand Lake, Chiricahua Mts., 2-VI-1969, 5750 ft., J. Burger, 1♂, reared. Cave Cr. Cn., Chiricahua Mts., 2/14-VIII-1966, J. G. Franclemont, 2♂♂, 5♀♀ (CU); Cave Cr. Ranch, Chiricahua Mts., 18-VIII-1966, R. Silberglied, 1♀ (CU). 5 mi. W. of Portal, 22-VIII-1964, 5000 ft., L. D. Anderson, 1♀ (CU); "Chiricahua Mts.", 16-VII, 1♀ (CU); Stewart Camp, 1 mi. S Portal, 23/25-VIII-1971, J. Doyen, 1♀ (UCB). E. Turkey Cr., Chiricahua Mts., 25-III-1970, 6860 ft., J. Burger, 1♂, 2♀♀, reared. Ash Spring, Chiricahua Mts., 25-III-1970, 6080 ft., J. Burger, 1♂, 2♀♀, reared. Ramsey Canyon, Huachuca Mts., 11-VIII-1955, G. Butler & Z. Noon, 1♀ (CU). Sunnyside Cn., Huachuca Mts., 8/12-VII-1940, D. G. Hall, 1♂ (CAS). Copper Cn., Huachuca Mts., 6-VII-1966, W. J. Hanson, 1♀ (GBF). *Cocconino Co.*—Oak Creek Cn., 6000 ft., VIII, F. H. Snow, 2♀♀ (USNM), 1♀ (CAS). *Gila Co.*—Workman Creek, Sierra Ancha Mts., 22/23-VIII-1969, 5404 ft., J. Burger, 1♂, 1♀, reared. Cherry Creek, 2.7 mi. S.E. of Young, 19-X, 1969, 5000 ft., J. Burger & J. Bequaert, 3♂♂, 1♀, reared. *Graham Co.*—Noon Creek, Mt. Graham, Pinaleno Mts., 28-VII-1954, F. G. Werner, 1♂ (CU). *Navajo Co.*—"Cooleys", Ariz. 24-IX-1919 (no collector data; locality possibly refers to Cooleys Ranch near Showlow, Arizona, a well-known resting place for early travelers), 1♀ (USNM). *Pima Co.*—Tucson, 29-V-1914, Bishopp No. 3535, B. R. Coad, 1♀ (USNM). Molino Basin, Santa Catalina Mts., 9-IX-1951, C. D. MacNeil, 1♀ (CU); 27-VII-1970, 4000 ft., E. Ordway, 1♀. *Santa Cruz Co.*—Babocomari Ranch, nr. Elgin, 20-VI-1969, 4500 ft., J. Burger & J. Bequaert, 3♂♂, 1♀, reared. O'Donnell Cn., ½ mi. N. of Ewing Ranch, 22-IX-1969, 4900 ft., J. Burger, 1♂, reared. Sylvania Spring, Huachuca Mts., VII-1969, 6000 ft., J. Bequaert, 1♀, reared. Dutch John Spring (Bog Spring), Madera Cn., Santa Rita Mts., 16-II/3-VIII-1969, 5000 ft., J. Burger, 2♂♂, 2♀♀, reared. Madera Cn., 5000 ft., J. Burger, 2♂♂, reared; 1-VIII-1970, Dietz & Rude, 1♀ (UCB).

NEW MEXICO. *Catron Co.*—3 mi. W. of Luna, 7-IX-1969, 7520 ft., J. Burger, 3♂♂, 2♀♀, reared.

MEXICO. *Chihuahua*.—Cuiteco, 3-VIII-1968, T. A. Sears, R. C. Gardner, C. S. Glaser, 1♀ (UCD). *Sonora*.—Sierra Manzanal, nr. Cananea, 28-XII-1969, 6600 ft., J. Burger, 2♂♂, 2♀♀, reared.

Tabanus caenosus specimens from various localities show some variation from the holotype and allotype. The denuded subcallus of most females is shiny black, but it can vary from dark brown to yellow in a few specimens, particularly some from the Chiricahua and Huachuca Mountains; the median callosity occasionally is detached from the basal callosity; the hind tibial fringe occasionally is all black or nearly so; the sublateral abdominal spots infrequently are enlarged posteriorly and nearly reaching the hind margins of the terga; the eyes occasionally have visible pilosity, especially in those females with a yellowish subcallus; and the size varies from about 14 mm to about 17.5 mm. A few males have the first antennal segment almost blackish; the abdomen sometimes has more or less extensive whitish areas sublaterally, especially on terga II-IV; occasionally there is extensive reddish-orange suffusion laterally on terga II-IV; and males vary from about 13.5 mm to 16.5 mm.

Tabanus caenosus can be easily separated from other members of the *gilanus* group by the denuded, crescentic subcallus and the isolated sublateral spots on the abdomen of the female, and the crescentic, denuded frontal triangle of the male. Stone's record of *Tabanus pruinosus* Bigot from Tucson, Arizona (Stone 1938) is referable to *T. caenosus*, and previous records of *T. pruinosus* from the United States are probably also in error.

Immature stages of *T. caenosus* were collected from northern Sonora, Mexico, north to Gila Co. in Arizona and east to Catron Co., New Mexico. Adults have been collected from southwestern Chihuahua, Mexico as far north as Coconino Co. in Arizona.

The immature stages are found most commonly in and around natural springs and seepage areas, cienegas and stream margins from 4250 to 6860 ft., with 1 record of larvae collected at 7520 ft. from Catron Co., New Mexico. The species name is derived from a Latin term for a muddy or wet area such as a seepage. The larvae inhabit mineral soil or organic substrates such as moss and sod. *Tabanus caenosus* is the most common tabanid living around springs and seepages in the 4000 to 7000 ft. range in southeastern and central Arizona. Larvae living in seepages lacking organic substrates tend to occur most commonly under logs and stones mired in the mud. The vegetation associated with the larval habitats varies from grassland and evergreen oak-grassland to ponderosa pine woodland. Mature larvae pupate in late June; adults emerge in early July and may be collected until September. Although the immature stages of *T. caenosus* are common in suitable habitats wherever it occurs throughout the known species range, adults, as other species in the *gilanus* group, are not often collected in quantity and hence are not usually well represented in collections. Long series can best be obtained by rearing the larvae.

Tabanus mogollon Burger, new species

fig. 4, 5

A medium-sized, dark grayish species with hyaline wings, white hair ventrally on first and second antennal segments, and hind tibial fringe with both white and black hair; male resembles *Tabanus stonei* Philip; female resembles *Tabanus gilanus* Townsend.

Holotype ♀, 14.0 mm. Eyes sparsely pilose; eye pattern in life brownish purple with purplish reflections and 2 light green bands. Front slightly widened above, gray pollinose, with 2 brownish spots on either side of median callosity, 1:3.3; basal callosity subquadrate, shiny black, not quite touching eyes, narrowly joined to suboval, black median callosity. Subcallus yellowish-gray pollinose, noticeably inflated. Face and genae grayish pollinose, clothed with dense, white hair and black hair adjacent to subcallus. First antennal segment enlarged but not extended dorsally over second segment; first and second segments brownish, clothed with black hair dorsally and white hair ventrally; 1 or 2 dark hairs present on ventral surface with white ones; third antennal segment brownish to dorsal angle of plate, black beyond; dorsal angle of plate very blunt, excision scarcely noticeable; length and height of plate subequal; annulate portion of third segment subequal to plate. Palpi pale creamy white, second segment stout basally, attenuated apically, clothed with white hair and scattered black hair.

Thorax blackish dorsally, with extensive grayish-pollinose lines, clothed with short, sparse, black erect hair and mixture of black and pale yellowish to golden-yellow appressed hair, black hair occurring chiefly on darker areas and yellowish hair on lighter areas; lateral margins of notum above wingbase and scutellum densely clothed with long white hair; scutellum clothed with mixture of black and yellowish appressed hair; pre-alar lobes orange, clothed with black erect hair. Pleura grayish pollinose, slightly tinged with yellow below pre-alar lobes and clothed with dense, long white hair. Coxae and femora blackish, gray pollinose and clothed with white hair except fore-femora black on upper surface; basal ½ of fore-tibiae orange, remainder black; mid-tibiae orange except black at extreme apex; hind-tibiae blackish, with grayish pollen; hind tibial fringe with mixture of black and white hair, basal ⅓ mostly white, remainder mostly black. Knobs of halteres dark brown, stalks pale.

Abdomen dull blackish, with extensive areas of grayish pollen and white markings; first abdominal tergum mostly gray pollinose except for 2 submedian black patches and a median white spot; remaining terga with pale median triangles and oblique, pale sublateral dashes; median triangles long and narrow, extending length of terga, abruptly enlarged along posterior margins of terga, progressively narrower on posterior segments and oblique sublateral dashes extending length of terga; second tergum with yellowish spot and pale hair anterolaterally. Venter grayish pollinose, clothed with white hair, except last 3 segments which have erect black hair predominating.

Horton Creek, Tonto Recreation Area, Gila Co., Arizona, 21-VIII-1969, 6100 ft., J. Burger, reared. Holotype deposited in USNM.

Allotype ♂, 14.0 mm. Eye profile rather wide and shallow, eye occupying about 0.77 of head height; eye rather densely pilose, area of larger facets very poorly differentiated from smaller facets; eye pattern in life dark brownish-purple

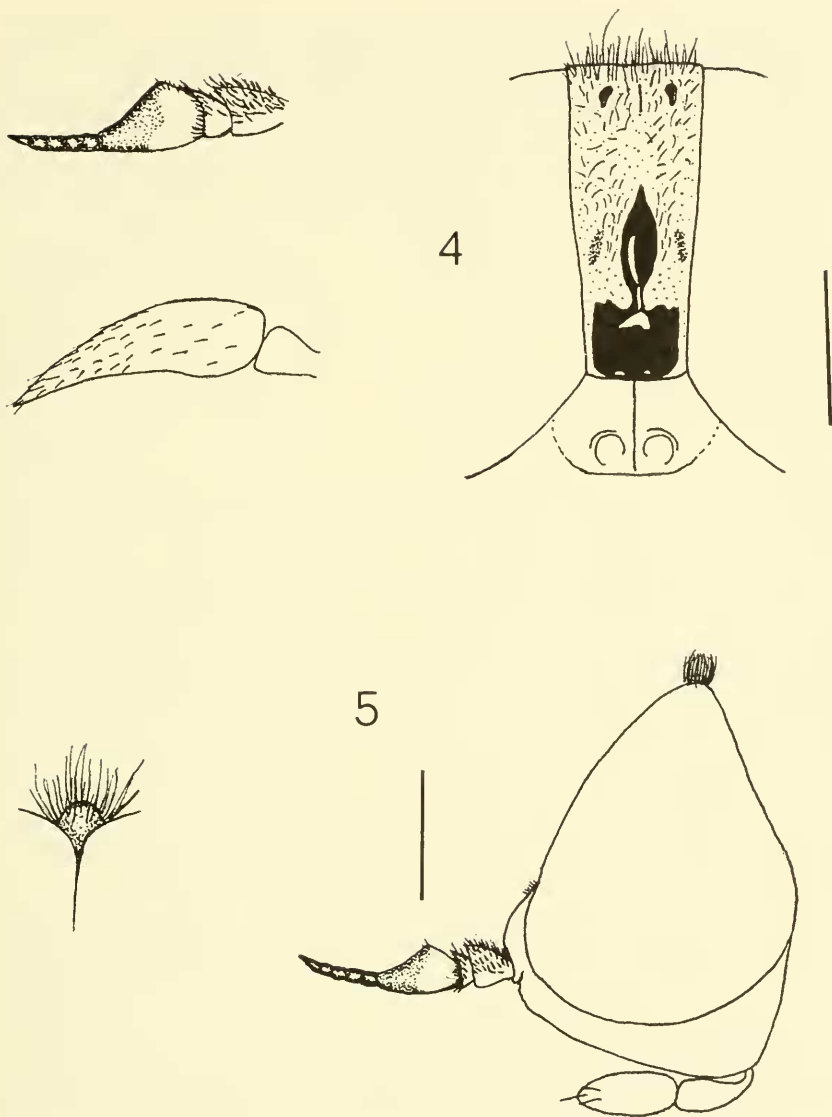


Fig. 4-5. *Tabanus mogollon*. 4, ♀. Frons, antenna and palpus of holotype. 5, ♂. Profile of head; vertical tubercle of allotype. Scale 1.0 mm.

ground color with 2 narrow, light green bands. Vertical tubercle very large and conspicuously raised above level of eyes at vertex, grayish pollinose and densely covered with stiff, erect black hairs. Frontal triangle grayish pollinose, with dark brown band across apex; triangle partially rubbed due to wear, subshiny

black beneath gray pollen. Genae and face whitish pollinose and clothed with white hair except adjacent to frontal triangle where hair is black. First and second antennal segments blackish, covered with gray pollen; first segment robust; third segment with plate yellowish brown on basal $\frac{2}{3}$, remainder blackish, length about 1.25 times greater than height; annulate portion black, about 1.3 times longer than plate, otherwise similar to holotype. Second segment of palpi stout, rounded apically, grayish basally, tinged with yellow apically, clothed with pale hairs and 1 or 2 black ones apically.

Thorax and scutellum covered with mixture of white and black, long, erect hair dorsally, otherwise similar to holotype. Legs similar to holotype except hind tibial fringe mostly white on basal $\frac{2}{3}$, remainder black.

Abdomen blackish, with rather narrow, indistinct pale median line extending length of terga and abruptly widened along posterior margin of each tergum; broad sublateral dashes extending obliquely length of terga; terga I-III with yellowish suffusion lateral to pale sublateral dashes. Venter grayish pollinose, clothed with white hair; last 2 segments of venter clothed with erect, black hair.

Cherry Creek, 2.5 mi. S.E. of Young, Arizona, Gila Co., 6-VII-1969, 5000 ft., J. Burger, reared. Allotype deposited in USNM.

Paratypes. ARIZONA. *Cochise Co.*—Southwestern Res. Sta., Chiricahua Mts., 12 June 1969, L. L. Pechuman, 1 ♀ (CU); 19 June 1969, L. L. Pechuman, 1 ♀ (CU); 1 July 1969, L. L. Pechuman, 1 ♀ (CU); 4 July 1969, L. L. Pechuman, 1 ♀ (CU); 28 June 1969, R. J. Adams, 1 ♀ (CU); 19 June 1969, C. B. Philip, 1 ♀ (CAS). East Turkey Creek, Chiricahua Mts., 30 June 1966, J. G. Franclemont, 1 ♂ (CU); 26 June 1966, J. G. Franclemont, 1 ♂ (CU); 1-VI-1969, 5920 ft., J. Burger, 2 ♂ ♂, reared; 23 Jun-5 Jul 67, C. W. Sabrosky, 1 ♀ (USNM). Herb Martyr Lake, Chiricahua Mts., 2-VI-1969, 5750 ft., J. Burger, 1 ♂, reared. W. Turkey Creek Campground, Chiricahua Mts., 16 June 1964, 5900 ft., J. Burger, 1 ♂. Douglas, 7/4/55, W. W. Jones, 1 ♀ (CAS). *Coconino Co.*—Clover Spring, S. of Clint's Well, 12-V-1970, 6860 ft., J. Burger, 1 ♀, reared. Oak Cr. Canyon, VII-9-41, Burt Hogden, 1 ♂ (CAS). *Gila Co.*—Cherry Creek, 2.5 mi. S.E. of Young, 6-VII-1969, 5000 ft., J. Burger, 3 ♂ ♂, 2 ♀ ♀, reared. *Pima Co.*—Rose Creek, Santa Catalina Mts., June 1970, 7000 ft., J. Burger, 1 ♀, reared. *Santa Cruz Co.*—Madera Canyon, Santa Rita Mts., 30 August 1959, 4880 ft., J. G. Franclemont, 1 ♂ (CU); June 14 '42, over 5000 ft. El., H. A. Scullen, 1 ♀ (CAS); Gardner Canyon, Santa Rita Mts., 19 May 1968, F. G. Werner, 1 ♀ (UA).

COLORADO. *Boulder Co.*—Boulder, 6-28-31, M. W. Sanderson, 1 ♀, (UCB). "SW Colorado", AUG, Osler, 1 ♀ (USNM).

NEW MEXICO. *Catron Co.*—Pinos Altos Area, Gila Nat. For., 31 May 1971, G. C. Clark, 1 ♂ (CU); 22 July 1969, L. L. Pechuman, 1 ♀ (CU). W. Fork Gila Riv., Gila Nat. For., June, 1971, Gerald Gates, 16 ♀ ♀ (CU).

TEXAS. *Jeff Davis Co.*—Davis Mts., 2 July 1940 (no collector given), 1 ♀ (CAS).

UTAH. *San Juan Co.*—Natural Bridges Natl. Mon., 14 July 1967, (no collector given), 1 ♀ (GBF).

Specimens of *T. mogollon* collected from different parts of the known range show some variation from the holotype and allotype.

In some females, the subcallus, normally pollinose, is partially denuded due to wear, revealing a shiny orange yellow to black ground color beneath the grayish pollen and occasionally the basal callosity is tinged with brown; some females have pale hair on the hind tibial fringe comprising nearly the basal $\frac{2}{3}$ of the fringe. Males from some localities, especially some from southern Arizona, have the first and second antennal segments reddish; the frontal triangle is not denuded in fresh specimens, being uniformly yellowish gray pollinose; the second segment of the palpus infrequently is prolonged into a small, downward-pointing nipple; and the thoracic vestiture is quite variable, from predominantly black hair with a few pale ones to nearly all white hair, the dark vestiture being most common in specimens from southern Arizona.

Females of *T. mogollon* have, in the past, been misdetermined as *Tabanus gilanus* in Arizona since both species occur there and are easily confused. However, the presence of white hair beneath the first and second antennal segments will separate *T. mogollon* females from *gilanus*, which have black hair only on the ventral surface of the antennae. Males of *T. mogollon* have been confused with *Tabanus stonei* Philip in Arizona and some records of *T. stonei* there are referable to *T. mogollon*. I have seen 1 male of *T. stonei* from Greer, Arizona (Apache Co.). *Tabanus mogollon* males may be distinguished from those of *stonei* by the mixed white and black vestiture on the thorax, less extensive grayish patches on the abdomen and the shorter, and stouter plate of the third antennal segment. *Tabanus mogollon* males may be separated easily from those of *gilanus* by the large eye facets being little differentiated from the smaller facets, in contrast to *gilanus*, whose large facets are sharply differentiated from the smaller ones.

Tabanus mogollon is named for the Mogollon escarpment which traverses part of the area in New Mexico and Arizona where this species is found, and which, in turn, is named for Juan Ignacio Flores Mogollon, Governor of the New Mexico Territory (1712-1715).

Larvae of *Tabanus mogollon* were collected along the margins of small streams and lakes and beneath logs in damp soil of seepage areas. In southern Arizona, this species appears to inhabit drier habitats than *Tabanus caenosus*, especially small, intermittent mountain streams from 4000 to 7000 ft. In southern Arizona, *T. mogollon* larvae are usually found at lower elevations (up to 7000 ft.) than those of a related species, *Tabanus gilanus* (7000 to 9000 ft.). *Tabanus mogollon* larvae survive in the intermittent stream habitat during dry periods by burrowing deeply into the mud or sand of the stream bed. In the Plateau Region of Arizona, the larvae inhabit springs, margins of small, natural lakes and ponds and probably

also streams above 6500 ft. The larvae usually occur in mineral soil. In southern Arizona, larvae pupate from early June to early July. Adults emerge during June and early July. Adults may be active until early September. In northern Arizona and New Mexico, adults may be collected most commonly in June. I have collected immature stages from the Chiricahua Mountains north to Yavapai and Coconino Counties in Arizona. The vegetation associated with the larval habitats varies from evergreen oak-grassland at lower elevations to pinyon-juniper and ponderosa pine woodland at higher elevations in the Plateau Region of Arizona.

In lieu of an extensive review of the species within the *Tabanus gilanus* group, I present a key to separate the males and females of 6 species that might be confused in collections due to lack of sufficient study material, leaving a more thorough review of the entire species group for a subsequent paper. Four of the 6 species treated here were not included in Stone's work on the Nearctic Tabaninae (Stone, 1938) and previous records of a fifth species, *Tabanus pruinosus*, in Arizona, are erroneous and refer to *Tabanus caenosus*, described above.

Key to Some Southwestern Species in the *Tabanus gilanus* Group
Females

1. Subcallus denuded, denuded area crescentic; pale, sublateral spots on abdomen usually isolated from hind margins of terga *caenosus* n. sp.
- Subcallus pollinose, or only partially and irregularly denuded 2
2. Pale sublateral markings on abdomen rounded spots, isolated from margins of terga; body conspicuously reddish pruinose *pruinosis* Bigot
- Pale sublateral markings on abdomen more extensive, usually elongate-oblique and reaching hind margins of terga 3
3. Hair beneath first and second antennal segments predominantly black, especially at apex of second segment 4
- Hair beneath first and second antennal segments predominantly white 5
4. Plate of third antennal segment broad basally, about as long as broad; subcallus always pollinose; pleura whitish pruinose; hind tibial fringe white on basal $\frac{1}{2}$ remainder black *boharti* Philip
- Plate of third antennal segment narrower basally, about 1.3 times longer than broad; subcallus often partially and irregularly denuded; pleura grayish; hind tibial fringe wholly black, or white only on basal $\frac{1}{5}$ *gilanus* Townsend
5. Plate of third antennal segment slender, elongate, about twice as long as wide; second palpal segment very stout basally, with few or no black hairs; appressed hairs on thorax whitish to very pale yellowish; hind tibial fringe white except for a few black hairs at apex; abdomen predominantly grayish, black maculations narrow *stonei* Philip
- Plate of third antennal segment shorter and more stout, about 1.2 times longer than broad; second palpal segment moderately stout basally, with many black hairs on apical $\frac{1}{3}$; appressed hairs on thorax golden yellowish

lowish; hind tibial fringe white on basal $\frac{1}{2}$, mostly black apically; abdomen mostly blackish, grayish pollen much less extensive than above, usually restricted to median triangles and sublateral spots *mogollon* n. sp.

Males

1. Frontal triangle mostly denuded, denuded area shiny black, crescentic *caenosus* n. sp.
- Frontal triangle pollinose, or, if partly denuded, denuded area subshiny and irregular 2
2. First and second abdominal terga entirely pale, covered with white hair *pruinosis* Bigot
- First and second abdominal terga not entirely pale, at least some black areas present 3
3. Ventral surface of first and second antennal segments clothed with mostly black hair; frontal triangle flattened in profile 4
- Ventral surface of first and second antennal segments clothed with mostly white hair; frontal triangle at least moderately inflated in profile 5
4. Eyes moderately pilose; thorax grayish, with grayish-black lines dorsally, appressed hairs cupreous; pleura whitish pruinose; abdomen grayish black with white markings; venter with broad, median band of black hair running length of abdomen; hind tibial fringe white on basal $\frac{1}{2}$ to $\frac{2}{3}$, remainder black *boharti* Philip
- Eyes densely pilose, thorax shining black, with narrow, grayish lines dorsally; appressed hairs pale yellowish; pleura dark grayish; abdomen shining black, with white markings; venter with black hair confined mostly to posterior 3 segments; hind tibial fringe black *gilanus* Townsend
5. Plate of third antennal segment slender, elongate, about twice as long as wide; frontal triangle only slightly inflated below; thorax and scutellum predominantly grayish pollinose, clothed with long, erect white hair; abdominal terga mostly grayish, with narrow median and sublateral black maculations; hind tibial fringe white except for few black hairs at apex *stonei* Philip
- Plate of third antennal segment stouter, about 1.25 times longer than wide; frontal triangle conspicuously inflated; thorax and scutellum predominantly blackish, with gray pollen and grayish longitudinal lines, clothed with mixture of black and white erect hair, black hair predominating; abdominal terga blackish, with white markings, median and sublateral black areas much more extensive than above; hind tibial fringe black on apical $\frac{1}{3}$ to $\frac{1}{4}$ *mogollon* n. sp.

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NEW SYNONYMY IN LAURENTIUS
(COLEOPTERA:CURCULIONIDAE:BARIDINAE)

Laurentius eduardus Warner (1956, Rev. Brasil Entomol. 6:39-42; type-locality Cochabamba, Bolivia) a pest of the potato plant, *Solanum tuberosum*, in Bolivia, was previously described as the species, *Cyrionyx bruchi* Hustache (1949, Boletim Do Museu Nacional, Zoologia 95:25, type-locality, Amanao, Catamarca, Argentina) (NEW SYNONYMY).

Hustache's description of the species was overlooked by me because he placed the species in the genus *Cyrionyx* Faust, a member of the tribe Pantatellini. *Laurentius bruchi* (Hustache) (NEW COMBINATION) belongs in the enormous complex of genera comprising the tribe Centrinini.

Also, *Linogarnia villosula* Hustache (1949, Boletim Do Museu Nacional, Zoologia, 97:90; type-locality, Rio Salado, Chaco de Santiago del Estero, Argentina) should be placed in *Laurentius* (*Laurentius villosulus*, NEW COMBINATION). Specimens of what is probably this species, collected at Tapia, Tucumán, Argentina, in January, 1972, on *Solanum elaeagnifolium*, by H. C. Zimmermann, were submitted for identification by C. J. DeLoach of the U. S. Department of Agriculture, Agricultural Research Service, Biological Control of Weeds Laboratory, Buenos Aires, Argentina.

The above synonymy was brought to my attention by Dr. Guillermo Kuschel.

ROSE ELLA WARNER, *Systematic Entomology Laboratory, IIBIII, Agr. Res. Serv., U. S. Department of Agriculture, c/o U. S. National Museum, Washington, D. C. 20560.*